

REMARKS

The rejection of claim 1 under 35 USC §112, first paragraph, has been obviated by revising the last paragraph of claim 1 to recite that the sleeve of the pretensioner mechanism “is integrally and concentrically connected to at an axial center portion of the lock gear of the lock mechanism such that the sleeve and the lock gear form a single, one piece member.” Support for this amendment is present in the last three paragraphs of page 7, which describes the concentric attachment of the sleeve and the lock gear as follows:

The lock gear 70 is structured with a cylindrical sleeve 72 fitted over the head portion 30A of the torsion bar 30 at the sleeve receiving portion 20B formed in the axial center portion of the spool 20, **a sleeve extension portion 73 extending coaxially from the sleeve 72** and having a size larger diameter than the sleeve 72, a lock gear main body 74 integrally formed on an outer periphery of the sleeve extension portion 73, and a plurality of ratchet teeth 76 formed on an outer periphery of the lock gear main body 74.

The sleeve 72 is mounted in the sleeve receiving portion 20B of the spool 20 while being prevented from withdrawing. In the axial center portion of the sleeve 72, a fitting hole 80 in a shape of a hexagonal hole is formed. In the fitting hole 80 of the sleeve 72, the above-described head portion 30A of the torsion bar 30 is fitted so as not to be able to rotate relatively. Therefore, the sleeve 72 rotates integrally with the torsion bar 30. An inner peripheral face of the sleeve extension portion 73 is knurled throughout its circumference (hereafter referred to as a “knurled face 82”). These sleeve 72 and sleeve extension portion 73 correspond to the “sleeve”.

The lock gear main body 74 is formed in a thick, flat, and annular shape and is formed coaxially and integrally with the sleeve extension portion 73.

The rejection of claim 1 under 35 USC §102(b) over the Ebner ‘176 patent has been obviated by revising the second paragraph of claim 1 to recite “a lock mechanism which includes a **metallic** annular lock gear concentrically mounted with respect to an axis of rotation of said retracting shaft with ratchet teeth being formed at an annular outer peripheral face of the lock gear and a lock plate disposed to be able to be engaged with the ratchet teeth of the lock gear, and which is structured to be able to prevent rotation of the retracting shaft in a webbing pulling-out direction by the lock plate being engaged with the lock gear **such that the lock gear remains concentric with respect to said axis of rotation during operation of the lock mechanism;....**” Support for the “**metallic**” limitation is expressly present in Figure 3, in which hatch marks for metal are clearly used in the cross-sectional

view of the integrally-formed sleeve 72 and lock gear main body 74. Support for the limitation specifying that “**the lock gear remains concentric with respect to said axis of rotation during operation of the lock mechanism;**...” is also expressly present in Figure 3, wherein the metallic sleeve 72 is concentrically disposed within a cylindrical sleeve-receiving recess 20B of the metallic spool 20. Clearly, the rigid nature of the metallic materials forming the sleeve 72 and the spool 20 would maintain the concentricity of the sleeve 72 and the lock gear main body 74 during the operation of the lock mechanism.

The Ebner ‘176 patent neither disclose nor suggests the webbing retractor defined in amended claim 1. In the last Office Action, the Examiner equated the inner wheel 32 with the recited lock gear of the lock mechanism, and the pawl 16 with the recited lock plate. However, the inner wheel 32 is not formed of **metal** as is now recited, but instead is formed of **plastic**, as described in column 5, lines 26-30:

In accordance with FIG. 2, a radially flexible bearing is formed by the inner wheel 32 itself, which is manufactured from **flexible plastic** containing glass fibre reinforcement. The front side of inner wheel 32a as part of the inner wheel 32 has several recesses 110, which can be designed as through or non-through recesses. (Emphasis added.)

Even more importantly, the inner wheel 32 does **not** remain “...**concentric with respect to said axis of rotation during operation of the lock mechanism;**...” Instead, the inner wheel is pulled radially upwardly during the operation of the pretensioner of this retractor and out of concentric alignment with the axis of rotation of the spool, as shown in Figure 6 and described in the paragraph bridging columns 5 and 6 as follows:

FIG. 6 shows the situation in the belt retractor with the normal blocking function when the pawl 16 engages in an appropriate toothed gear of belt reel 12. The normal blocking function of the belt retractor is effected by a pulling movement in belt webbing 14. When the belt webbing 14 is pulled upwards, this results in a torque in the inner wheel 32, which partly supports itself on the pawl 16 and thus leads to **a radial upward movement of the inner wheel 32** until its external coupling toothings supports itself in the internal coupling toothings of the outer ring 40. The recesses 120 permitting this movement are also indicated in FIG. 6. (Emphasis added.)

Finally, the lock mechanism of the Ebner ‘176 patent does not the inner wheel 32 does **not** include the recited “**lock plate** disposed to be able to be engaged with the ratchet teeth of the

lock gear,....” Instead, the ratchet teeth of the inner wheel 32 engage the inner ratchet teeth of the outer ring 40, as described in column 6, lines 37-46:

In the embodiment shown in FIG. 2, the torsion bar 30 is also pressed upwards in the direction of the arrow when the belt is tensioned, causing the inner wheel 32 to be pushed upwards as well until its external coupling toothing strike the internal coupling toothing of the outer ring 40.

For all of these reasons, amended claim 1 is clearly patentable over the prior art of record.

Claim 2 is patentable at least by reason of its dependency on amended claim 1.

Claim 3 is patentable not only for the recitation of all of the aforementioned limitations with respect to amended claim 1, but for its further recitation of a pretensioner having a rack and pinion. Contrary to the position taken by the Examiner in the last Office Action, the provision of an inner wheel 32 in the Ebner ‘176 patent that is both radially movable and plastically deformable in response to the forces applied thereto by a cable and pulley-type pretensioner is entirely incompatible with the use of a rack and pinion type pretensioner in this device, as such a rack and pinion pretensioner would **not** apply the necessary radial forces to actuate the inner wheel of Ebner.

Claim 4 is patentable at least by reason of its dependency on amended claim 3.

Claim 5 is patentable not only for the recitation of all of the aforementioned limitations with respect to amended claim 1, but for its further recitation of a lock plate **“pivotably mounted on the frame and movable into engagement with the ratchet teeth of the lock gear,....”** By contrast, the ratchet teeth of inner wheel 32 do not engage a movable lock plate, but instead engage the inner ratchet teeth of the outer ring 40.

Claims 6-8 have been cancelled, and need no further discussion.

Finally, applicants submit that new claim 9 is likewise patentable, albeit for different reasons than those given with respect to the previously discussed claims. In addition to reciting that the sleeve of the pretensioner mechanism is “integrally and concentrically connected to the lock gear of the lock mechanism such that the sleeve and the lock gear form a single, one piece member,...” new claim 9 recites that

one end portion side of the sleeve of the pretensioner mechanism is connected to the other end portion of the torsion bar, and an inner peripheral face of the other end portion side of the sleeve is **knurled**, and the **knurled inner peripheral face** of the other end portion side of the sleeve is **directly engaged with the clutch plate** during operation of the pretensioner mechanism such

that the rotating force of the pinion is transmitted, via the clutch plate, to the other end portion side of the sleeve...

Accordingly, in the present invention, the number of necessary parts is reduced **not only** by forming the lock gear and the sleeve (which have been separate members in prior art) integrally as a single one-piece member, **but also** by providing a knurling on the inner peripheral face of the sleeve so that it may **directly engage** with the clutch plate, thereby obviating the need for additional parts between the sleeve and the clutch plate.


In contrast to the invention recited in claim 9, the inner wheel 32 and integral sleeve of the Ebner '176 patent does **not** have the recited "knurled" inner peripheral face that is "**directly engaged** with the clutch plate during operation of the pretensioner mechanism..." (emphasis added). Instead, all that the integral sleeve of the Ebner '176 patent has is a hexagonal recess for receiving the hexagonal outer surface **of the torsion bar 30** (see Figure 1). Accordingly, the Ebner retractor must include the disc 26 and pawls 24 to engage the clutch to the inner wheel 32. For all of these reasons, new claim 9 is clearly patentable over the Ebner '176 patent.

New claim 10 is patentable not only for its dependency on new claim 9, but for its recitation that "the lock gear remains concentric with respect to said axis of rotation during operation of the lock mechanism."

Now that all of the claims are believed to be patentable, the prompt issuance of a Notice of Allowance is earnestly solicited.

Respectfully submitted,

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